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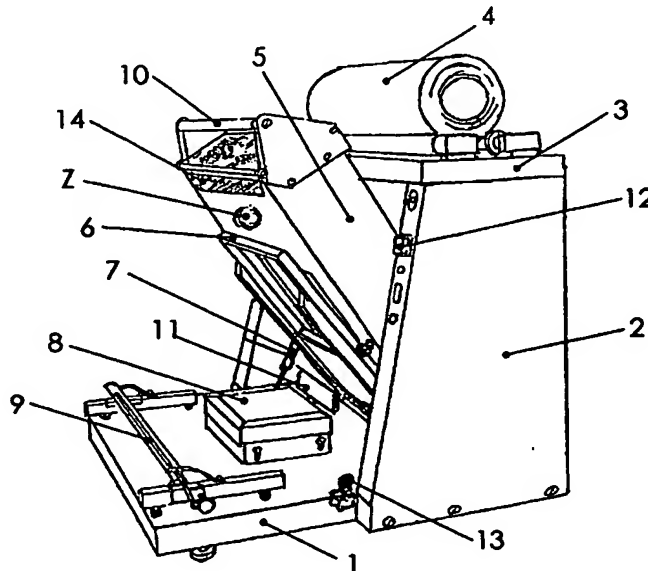
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(54) Title: DEVICE AND PROCESS FOR PACKAGING PRODUCTS IN A STRETCHABLE PLASTIC FILM .



(57) Abstract: A process and a device are disclosed for packaging products in a stretchable plastic film (14); the device comprises: means (8, 30) for supporting and heating a product; means (55, 56, 57; 6) for supplying and clamping the film (14) in a position overlaying the product; means (5) for contacting and adhering the film (14) along its still not-free side; means (6) for locking and releasing the cut film (14) in stretched contact with the product; means (15, 16, 45, 46) for bending and adhering the film (14) to the product perimeter; means for removing the packaged product; and control means (13, 20, 33, 34, 35, 36, 38) for the device.

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DEVICE AND PROCESS FOR PACKAGING PRODUCTS IN A STRETCHABLE PLASTIC FILM

The present invention refers to a device for packaging products in a stretchable plastic film, and to a process that uses such device. The below-described device is in practice an electromechanical arrangement that performs the winding of a product to be packaged into a plastic film, in a surrounding and stretched way, completely closing the product to be packaged.

Various systems are known in the art and operate, through different modes, to perform the winding of a plastic film around a product. These systems, that are generally automated, operate by pushing the product to be packaged either inside a sleeve formed by the plastic film that is afterwards cut and bent on the two sides under the product, or by pushing the product to be packaged upwards from below on a sheet of plastic film, stretched through suitable mechanical means and clamping jaws, and afterwards bent under the product itself through a jaw mechanism with automatic movement and with a possible product translation.

These systems require machines with highly complex and costly mechanical devices with many motored and specifically programmed parts. In such case it is difficult to constantly operate such machines, that require, in addition to specific plastic films with high quality, also high maintenance costs, given the complex contents of the various mechanisms composing them. They further require a high degree of preventive maintenance

from the operator, since residuals of the various products to be packaged can obstacle the movements of the mechanical machine parts, especially the means for clamping and stretching the plastic film.

Object of the present invention is solving the above prior-art problems, by providing a device and its related process, that are easily manufactured, installed and operated, allow performing all packaging operations manually, but also automatically, in a simple and straightforward way by the end user.

A further object of the present invention is providing a device and a process as mentioned above, in which the device is equipped with a reduced number of component parts, and anyway allows realising a great number of packaging operations (also of a variable format) in a controlled and efficient way, without damages for the operators.

The above and other objects and advantages of the invention, as will appear from the following description, are obtained by a device and a process as claimed, respectively, in Claims 1 and 37. Preferred embodiments and non-trivial variations of the present invention are claimed in the dependent Claims.

The present invention will be better described by some preferred embodiments thereof, given as a non-limiting example, with reference to the enclosed drawings, in which:

- Figure 1 is a perspective view of an embodiment of the packaging device according to the present invention in its opening phase;
- Figure 2 is a perspective view of the device of Fig. 1 in a closure phase;
- Figure 3 is a side sectional view of the device in

Fig. 2;

- Figure 4 is a detailed view of the device in Fig. 1 that shows the film cutting means;

- Figure 5 is a detailed view of the device in Fig. 1 that shows the supporting and heating means;

- Figure 6 is a detailed view of the device in Fig. 1 that shows the packaging cover with the film pressing frame;

- Figure 7 is a detailed view of the device in Fig. 2 with the cover in a closing position;

- Figure 8 is a top view of the device in Fig. 1;

- Figure 9 is a part of the bending blades of the device in Fig. 1;

- Figure 10 is another part of the bending blades in their mutual position and handling;

- Figure 11 is a part of the blade bending operation on the product;

- Figure 12 is a part of another blade bending operation on the product;

- Figure 13 is a schematic view that shows a manual film supply mode in the device in Fig. 1;

- Figure 14 is a side sectional view that shows an automatic film supply mode in the device in Fig. 1;

- Figure 15 is a detailed view of part of Fig. 14; and

- Figure 16 is a schematic side view of a variation of the device of the invention.

With reference to the Figures, a preferred embodiment of the device and process of the present invention is shown and described. It will be immediately obvious to the skilled people in the art that numerous variations and modifications (for example related to shape, sizes, various colours and parts with equivalent functionalities)

could be made to the described device and process without departing from the scope of the invention as claimed in the enclosed Claims.

The term "product" herein below means both a single object or element to be packaged (for example in the foodstuff field), and the same object or element placed in a container, housing, tray or the like, for packaging the whole assembly.

The device described herein below corresponds to a semi-automatic system in which the functions of supplying the plastic film 14 for packaging the products are performed manually, as well as the descent of the packaging head 5 (see Fig. 1-2).

With reference first of all to Fig. 1, the device consists in a basement 1, where two shoulders 2 are fixed that carry the head with rollers 3 that support the coil 4 of the stretchable plastic film 14. In the shoulders 2, the visual devices 12 of the electric control panel (for example displays of the number of packaged pieces, switches, etc.) can be inserted.

The basement 1 is composed of a structure that is sturdy enough to support all efforts acting on pins and connections of the related gas springs 7 that balance the head 5, in order to secure the side shoulders 2. Moreover, the heated plane 8 and the rotating and restraining supports (not shown) of the basculating head 5 are fastened on the basement 1. Moreover, the suitable limit sensors (not shown) for operating the machine, in addition to all those components related to the electric panel (not shown), are fastened and contained in the basement 1.

In order to work with the above-mentioned device, the coil 4 of the stretchable plastic film 14 is placed on the roller head 3 of the machine. The film 14 is unwound

through the containment rollers a, b, c, d of the basculating packaging head 5. Manually, or automatically, the film 14 must be interposed for its meaningful length, suitable for packaging, between the basculating head plane Z and the film-locking frame 6.

In order to best use the film 14 that winds the product to be packaged in its correct length, a hot-wire cutter 9 for the film 14 is adjusted and is placed on the basement 1 by horizontally translating it and making it operate when the head 5 is lowered.

After that, the product (or tray containing the product) is placed on the hot plane 8 by positioning it in its correct position, using the stop abutment 11. At that time, by lowering the packaging head 5 through the handle 10 down to the lower stop of the head 5 itself, the limit sensor 13 is actuated in the same position and it starts the suitable mechanisms placed inside the head 5, that are adapted to wind the film 14 onto the product (or tray containing the product) along all its sides in a stretched way.

After having ended the automatic packaging cycle, the packaging head 5 is kept in its upper stop position (see Fig. 1), and the packaged product arranged on the hot abutment plane 8 can be manually taken by the operator. It is obviously possible to provide for variations that allow automating such operation, for example as bands (not shown) adapted to be handled when the device head 5 is in its upper stop position to take the packaged product and lay a new product to be packaged on the abutment plane 8.

The abutment plane 8 is heated in order to obtain a closed and stable package, since the heat emanated therefrom heats the four edges of the film 14 overlapped by the machine and inserted under the product by the

machine itself, thereby attaching the film 14 edges to the product.

Herein below the parts and the mechanical and electromechanical arrangements that realise the functionalities of the present invention will be described and shown.

Fig. 4 first of all shows the cutter assembly 9 for the film 14.

Such cutter 9 is composed of a blade 25, preferably made of steel, heated through an electric resistance placed inside it. This blade 25 is secured onto an insulated metal guide 9' that is longitudinally slidable as shown by the arrows and is secured in the desired position by means of knobs 27.

The hot blade 25 with the packaging head 5 lifted is protected by a screen 23 placed on springs 24. The hot blade 25, going out in 28 from the recess obtained on the screen 23, operates on the plastic film 14 stretched under the packaging head 5 generating the melt cutting of the film 14. The whole hot blade assembly 29 is placed on springs 26 that, during the packaging head 5 lowering operation, are pressed together with the springs 24. As already described, with pressed springs 24, the hot blade 25 goes out of the screen 23 by means of the recess 28 generating the plastic film 14 cutting, and the springs 26 accompany the hot blade assembly 29 in parallel with the descent of the packaging head 5 and allow the hot blade 25 to operate for a longer time for cutting the film 14.

Fig. 5 instead shows in detail the heated plane 8 for resting the product to be packaged.

Such plane 8 is placed on the machine basement 1 in a central position to the packaging area of the head 5. This resting plane 8 for the products to be packaged is heated

through electric resistances 30 placed inside the metallic box 8 composing it. Obviously, the heated plane 8 temperature is not relevant and remains within the limits of the operator safety standards. The temperature is adjusted by a suitable electric thermoregulating system 31 inserted into the basement 1.

The purpose of having an hot resting plane 8, as already previously described, is welding the film 14 edges placed under the product in contact with the hot plane 8 after having packaged the product.

Fig. 6 schematically shows the frame 6 for pressure-locking the film 14 and the related control mechanism 20.

With basculating packaging head 5 lifted, the pressing frame 6 of the film 14 is opened with respect to the plane Z of the packaging head 5. The film 14 is manually inserted (Fig. 13) from the top downwards in the space existing between frame 6 and plane Z of the packaging head 5. The length of the inserted film is adjusted depending on the width of the product to be packaged.

As shown in Fig. 6, the pressing frame 6 of the film 14 is composed of a frame 6 hinged to the lower end 34 of the basculating packaging head 5. This frame, preferably built like a fork, has a rim 32 inserted whose size is equal to the external perimeter of the hole 37 of the packaging head 5, where a gasket (not shown) is inserted, adapted to block the film 14 with the frame 6 closed. A suitable electromagnet 20, placed integral with the basculating head 5, is controlled by the feeler system 36 of the limit sensor 35 and a related electric system, and starts operating when the packaging head 5 starts lowering. The metallic striker of the magnet 33 integral with the lever connected to the pressing frame 6 - fulcrum

34 is attracted through an electric pulse towards the magnet 20, making the frame 6 close and locking the plastic film 14 with a force that is proportional to the electric current intensity operating on the magnet 20 itself.

At the end of the electric current pulse on the magnet 20, the frame 6 goes back to its opening position through the action of a spring 38 that works under traction.

During the basculating packaging head 5 descent, the plastic film 14, blocked by the pressing frame 6 onto the hole perimeter of the packaging head 5, is stretched by inserting the product itself placed on the heated plane 8.

At the lower end-of-stroke, the packaging head 5, by abutting onto its suitable striker, actuates the limit sensor 35 and, through motor 19 and transmission belts 17, actuates the blades 15, 16, 45, 46, that wind the product with the plastic film 14 by also inserting it under the product placed on the hot plane 8.

The movement of the blades 15, 16, 45, 46 is automatic and reciprocating, controlled by limit sensors 39 and 40.

Upon starting the blades 15, 16, 45, 46 for packaging the product, the pressing frame 6 of the plastic film 14 is opened, freeing the film 14 that has already been cut by the hot blade 9, and the blades 15, 16, 45, 46 proceed in packaging the product itself. The detachment of the pressing frame 6 of the film 14 from the base Z of the packaging head 5 is controlled by the limit sensor 41, that is longitudinally adjustable as shown by the arrow in Fig. 7. This adjustment allows delaying or anticipating the frame 6 detachment that locks the plastic film 14, in order to obtain a greater or lower film 14 tension when

packaging the product.

Fig. 8 schematically shows in a plan view the packaging head 5. It is composed of a metallic container, having a plane bottom with an adequate opening for the maximum format of the packages that the machine can perform. The supports carrying the rotating shafts 18 are fixed to the metal walls of such container. At the ends of these rotating shafts 18, two toothed pulleys that carry a toothed belt 17 (or similar transmission means) are fixed. The packaging blades 15, 16, arranged on lateral guides 53 and overlapped as in Fig. 9, are connected to the toothed belts 17, by means of clamps 43, 44, 50, 51. These packaging blades 15, 16, 45, 46 can translate on the lateral guides 53 by means of clamps 43, 44, 50, 51 connected to the toothed belts 17 till they overlap. The movement of the belts 17 is transmitted by the system with ratio-motor 19, toothed pulleys, rotating shafts 18.

As already described previously, these blades 15, 16, 45, 46 have an automatic reciprocating movement as shown by the arrows (Fig. 8).

The blade 15 is connected, by means of two oscillating arms 48, 49 and two rotating pins 52 for each arm 48, 49, to the two blades 45, 46 that are longitudinally placed with respect to the head 5 and transversally placed with respect to the blades 15, 16. During the translation approaching movement of the blades 15, 16, the two arms 48, 49 are hinged through the rotating pins 52 on the blade 15 and the blades 45, 46: these latter ones thereby converge towards the center of the packaging area as shown by the arrows (Fig. 8 and 19). As already previously described, the movement of the blades 15, 16, 45, 46 is reciprocating, being connected to the ratio-motor - toothed pulleys - rotating shafts -

terminals system.

Fig. 11 and 12 schematically show the overlapping and position of the blades 15, 16, 45, 46 during the product packaging cycle. As schematically shown in Fig. 11, the blades 15, 16 when approaching, insert the film 14 under the product on two sides and the blades 45, 46 (Fig. 12) insert the film 14 simultaneously under the product on the other two sides; then, the film 14 under the product appears with the four edges overlapped by the blades 15, 16, 45, 46 and welded by means of heat supplied by the heating plane 8.

An improvement as regards the use of the machine is shown in Fig. 14 and 15. They show a schematic view related to the automatic positioning of the film 14. The film 14 is passed on a motored rotating roller 55. This roller 55 is connected through transmission belts to the roller 18'. The ratio-motor assembly 54, operating on the roller 55, starts operating the transmission belts (placed on the sides of the packaging head 5). The transmission belts are connected to and control the jaws 56 that are opened and closed with a mechanical system that operates thereon when they reach the translation point determined by the limit sensors 58, 59. These limit sensors 58, 59, according to their position, make the jaws 56 translate, and the jaws 56 grip and drag the plastic film 14 inserting it between plane "Z" of the packaging head 5 and the pressing frame 6 of the film 14.

This gripping movement of the film 14 by the jaws 56 automatically occurs when the packaging head 5 is lifted in its upper stop position, thereby facilitating the operator's manual handling during the product packaging process.

According to a variation of the device of the

invention shown in Fig. 16, the head 5 is adapted to perform, in addition to the opening and closing movement by lifting and lowering, a basculating approach and retraction movement with respect to the device structure: such movements of the head 5 are provided to facilitate the works of a responsible operator. They are obtained in particular because the head 5 is connected to the shoulders 2 through a toggle pin 60 adapted to provide at one of its ends 62 a point secured to the head 5 and at another of its ends 64 a rotating pin point with the shoulders 2.

According to a further variation of the inventive device, also shown in Fig. 16, the means 8 for supporting and heating the product are adapted to slide along the basement 1 of the device in order to further facilitate the works of a responsible operator. In particular, the means 8 can slide onto the basement 1 through sliding guides 66 or other suitable systems, being then stopped in their operating position once having loaded thereon the product to be packaged.

With the above-described device, it is possible to realise an automated or partially automated inventive process, that comprises the following main steps:

- supporting and simultaneously heating one of the products to be packaged on a lower abutment side of the product;
- supplying the film 14 from the storage means 4 in a position overlaying the product to be packaged;
- clamping the film 14 in the position overlaying the product to be packaged;
- contacting the clamped film 14 with the product to be packaged, in such a way as to adhere the film 14 to the product in a stretched position;

- cutting the film 14 in stretched contact with the product along its side that is still not connected to the film 14 coming from the storage means 4;
- releasing the cut film 14 in stretched contact with the product;
- bending the film 14 under the product through a bending action on a whole lower perimeter of the product, where such bending step allows the film 14 to adhere to the product on its lower heated abutment side by glueing together the four edges of the film 14; and
- removing the product packaged in the film 14.

In particular, the step of contacting the clamped film 14 with the product to be packaged is performed by keeping the product still and by placing above it the clamped film 14, but it could also be performed in reverse, namely by keeping the clamped film 14 still and by pushing the product against it.

Moreover, the step of contacting the clamped film 14 with the product further comprises adjusting the film 14 tension onto the product, while the step of clamping the film 14 further comprises the step of adjusting the film 14 locking pressure by adjusting the electric voltage on the magnet 20.

According to a further particular feature of the inventive process, the step of clamping the film 14 further comprises the step of performing a film 14 unlocking that is variable in time, with respect to the device cycle, with respect to the step of bending the film 14.

And still, the step of cutting the film 14 is performed through cutting means 25 and the process further comprises the step of heating the cutting means 25 before

the step of cutting the film 14.

In a variation of the inventive process, it further comprises, after the step of supporting the product, the step of placing the product in a prefixed packaging position.

Moreover, the step of bending the film 14 under the product could occur simultaneously on all sides of the product, or could occur firstly on two product sides and then on other two product sides opposed therewith.

Finally, the inventive process further comprises the step of pressing the product to keep the product still during its packaging with the film 14.

CLAIMS

1. Device for packaging products in a stretchable plastic film (14), characterised in that it comprises:

- means (8, 30) for supporting one of said products to be packaged and for heating a lower abutment side of said products;
- means (55, 56, 57) for supplying said film (14) from storage means (4) in a position overlaying the product to be packaged;
- means (6) for clamping said film (14) in said position overlaying the product to be packaged;
- means (5) for contacting said clamped film (14) with the product to be packaged, in such a way as to adhere said film (14) to the product in a stretched position;
- means (9) for cutting said film (14) in stretched contact with the product along its side that is still not connected to the film (14) coming from the storage means (4);
- means (6) for releasing said cut film (14) in stretched contact with the product;
- means (15, 16, 45, 46) for bending said film (14) under said product through a bending action on a whole lower perimeter of said product, said bending means (15, 16, 45, 46) allowing the film (14) to adhere to said product on its lower heated abutment side;
- means for removing said product packaged in said film (14); and
- control means (13, 20, 33, 34, 35, 36, 38) for checking the operations of said device.

2. Device according to Claim 1, characterised in that said means (5) for contacting said clamped film (14) with the product to be packaged are composed of at least one oscillating head (5) with a basculating movement.
3. Device according to Claim 2, characterised in that the basculating movement of said head (5) is manual.
4. Device according to Claim 2, characterised in that the basculating movement of said head (5) is motored.
5. Device according to Claim 2, characterised in that said head (5) is equipped with a bottom (2) that has an opening for inserting the product to be packaged.
6. Device according to Claim 2, characterised in that said head (5) is further equipped with means (41) for adjusting the tension of said film (14) on the product.
7. Device according to Claim 6, characterised in that said means (41) are composed of at least one limit sensor (41) whose detection position is adjustable along an axis of said head (5).
8. Device according to Claim 1, characterised in that said means (6) for clamping said film (14) are composed of a pressing frame (6) of the film (14) that is hinged to said means (5) and is adapted to be oscillatingly opened and closed with respect to said means (5).
9. Device according to Claim 8, characterised in that said pressing frame (6) of the film (14) is equipped with means (20, 22, 33, 34, 35, 36) adapted to perform the locking of the film (14).
10. Device according to Claim 9, characterised in that said locking means (20, 22, 33, 34, 35, 36) of the film (14) are composed of an electromagnet (20) placed

integral with the basculating head (5) and controlled by a feeler system (36) of a limit sensor (35) and by a related electric system, said electromagnet (20) starting to operate when the packaging head (5) starts to be lowered, a metallic abutment of said magnet (33) integral with a lever connected to said pressing frame (6) - fulcrum (34) being attracted through an electric pulse onto said magnet (20) making thereby the frame (6) close and locking the plastic film (14) with a force that is proportional to the electric current intensity operating on said magnet (20).

11. Device according to Claim 8, 9 or 10, characterised in that said pressing frame (6) of the film (14) is equipped with means (38) for unlocking the film (14).
12. Device according to Claim 11, characterised in that said unlocking means (38) are composed of a spring (38) that works under traction onto said frame (6) and that, at the end of the electric current pulse on said magnet (20), takes back said frame (6) to its opening position.
13. Device according to Claim 1, characterised in that said means (6) are adapted to realise an adjustment of the film (14) tension on the product through an opening delay of said pressing frame (6) due to electromechanical and electronic means (20, 33, 34, 35, 36) activated by a limit sensor (41).
14. Device according to Claim 1, characterised in that said means (9) for cutting said film (14) are composed of at least one retractable hot blade (25) for cutting the plastic film (14) with possible adjustment of the film (14) cutting along its length.
15. Device according to Claim 14, characterised in that said film (14) cutting blade (25) is protected by an

- oscillating screen (23) and is arranged on an oscillating blade assembly (29).
16. Device according to Claim 15, characterised in that said screen (23) and said blade assembly (29) are oscillating on respective springs (24, 26) in order to perform a film (14) cutting that is prolonged in time for a better cutting efficiency, when the head (5) is lowered and presses the hot blade assembly (29).
 17. Device according to Claim 14, 15 or 16, characterised in that said film (14) cutting blade (25) is equipped with heating means (28) with electric resistance under direct current or with electric pulses.
 18. Device according to Claim 14, 15, 16 or 17, characterised in that said blade (25) performs the film (14) cutting with a mechanical knife.
 19. Device according to Claim 14, characterised in that said blade (15) is placed on said means (5).
 20. Device according to Claim 1, characterised in that said means (8, 30) for supporting one of said products to be packaged and heating its lower abutment side are composed of at least one hot plane (8) to rest thereon the product to be packaged, said hot plane (8) being equipped with adjustable height and adjustable temperature.
 21. Device according to Claim 1, characterised in that said means (8) are fixed with respect to said means (5), said means (5) being displaced above said means (8) for laying said film (14) above the product to be packaged.
 22. Device according to Claim 1, characterised in that said means (8) are moving with respect to said means (5), said means (8) being lifted to push the product against said film (14) being kept still by said means

- (5).
23. Device according to Claim 1, characterised in that it is further equipped with a moving retractable abutment (11) adapted to place the product to be packaged onto said means (8).
24. Device according to Claim 23, characterised in that said moving retractable abutment (11) is controlled by mechanical and electromechanical mechanisms that are activated when the basculating packaging head (5) is lowered.
25. Device according to Claim 1, characterised in that said means (15, 16, 45, 46) for bending said film (14) under said product are composed of packaging blades (15, 16, 45, 46) that are moving along an opposed alternate direction and simultaneously on the film (14).
26. Device according to Claim 1, characterised in that said means (15, 16, 45, 46) for bending said film (14) under said product are composed of packaging blades (15, 16, 45, 46) that are moving along an opposed alternate direction, not simultaneously, but ones (45, 46) delayed with respect to other ones (15, 16).
27. Device according to Claim 25 or 26, characterised in that said packaging blades (15, 16, 45, 46) are overlapped in pairs, ones (15, 16) with respect to other ones (45, 46).
28. Device according to Claim 25, 26 or 27, characterised in that a movement of said blades (15, 16, 45, 46) is automatic and reciprocating, and is controlled by limit sensors (39, 40).
29. Device according to Claim 25, 26, 27 or 28, characterised in that said blade (15) is connected, by means of two oscillating arms (48, 49) and two

- rotating pins (52) for each arm (48, 49), to said blades (45, 46) that are longitudinally placed with respect to said head (5) and transversally placed with respect to said blades (15, 16).
30. Device according to Claim 1, characterised in that it is equipped with means (21) for parking the product that are adapted to keep the product still during its packaging with the film (14).
31. Device according to Claim 1, characterised in that said means (55, 56, 57) for supplying said film (14) are of a manual type.
32. Device according to Claim 1, characterised in that said means (55, 56, 57) for supplying said film (14) are composed of motored rotating rollers (55, 18') and jaws (56), said rollers (55, 18') being mutually connected through transmission belts, a ratio-motor assembly (54) operating on said roller (55) to operate the transmission belts placed on the packaging head (5) sides, said transmission belts being connected to and driving and moving the jaws (56) that are opened and closed through a mechanical system that operates on said jaws (56) when they reach a translation point determined by limit sensors (58, 59), said limit sensors (58, 59), according to their position, making the jaws (56) translate, said jaws (56) catching and dragging the plastic film (14) to perform its insertion between the plane (Z) of the packaging head (5) and the film (14) pressing frame (6), said film (14) catching movement of said jaws (56) automatically occurring when the packaging head (5) is lifted in its top stopped position.
33. Device according to Claim 1, characterised in that said means (5) are adapted to perform, in addition to

the opening and closing movement through lifting and lowering, a basculating advancement and retreat movement with respect to a structure of said device, said movements of said means (5) facilitating the work of an operator.

34. Device according to Claim 33, characterised in that said means (5) are connected to said shoulders (2) through a toggle pin (60) adapted to provide at one of its ends (62) a point fixed to said means (5) and at another of its ends (64) a pivot point rotating with said shoulders (2).
35. Device according to Claim 1, characterised in that said means (8) for supporting and heating said product are adapted to slide along a basement (1) of said device to facilitate the work of an operator.
36. Device according to Claim 35, characterised in that said means (8) slide onto said basement (1) through sliding guides (66).
37. Process for packaging products in a stretchable plastic film (14) using the device according to any one of the previous Claims, characterised in that it comprises the steps of:
- supporting and simultaneously heating one of said products to be packaged on a lower abutment side of said product;
 - supplying said film (14) from storage means (4) in a position overlaying the product to be packaged;
 - clamping said film (14) in said position overlaying the product to be packaged;
 - contacting said clamped film (14) with the product to be packaged, in such a way as to adhere said film (14) to the product in a stretched position;

- cutting said film (14) in stretched contact with the product along its side that is still not connected to the film (14) coming from the storage means (4);
 - releasing said cut film (14) in stretched contact with the product;
 - bending said film (14) under said product through a bending action on a whole lower perimeter of said product, said bending step allowing the film (14) to adhere to said product on its lower heated abutment side by glueing together the four edges of the film (14); and
 - removing said product packaged in said film (14).
38. Process according to Claim 37, characterised in that said step of contacting said clamped film (14) with the product to be packaged is performed by keeping said product still and by placing above it said clamped film (14).
39. Process according to Claim 37, characterised in that said step of contacting said clamped film (14) with the product to be packaged is performed by keeping said clamped film (14) still and by pushing said product against it.
40. Process according to Claim 37, characterised in that said step of contacting said clamped film (14) with the product further comprises adjusting the film (14) tension onto the product.
41. Process according to Claim 37, characterised in that said step of clamping said film (14) further comprises the step of adjusting the film (14) locking pressure by adjusting the electric voltage on the magnet (20).
42. Process according to Claim 37, characterised in that said step of clamping said film (14) further comprises

the step of performing a film (14) unlocking that is variable in time, with respect to the device cycle, with respect to the step of bending said film (14).

43. Process according to Claim 37, characterised in that said step of cutting said film (14) is performed through cutting means (25) and said process further comprises the step of heating said cutting means (25) before said step of cutting said film (14).
44. Process according to Claim 37, characterised in that it further comprises, after said step of supporting said product, the step of placing said product in a prefixed packaging position.
45. Process according to Claim 37, characterised in that said step of bending said film (14) under said product occurs simultaneously on all sides of the product.
46. Process according to Claim 37, characterised in that said step of bending said film (14) under said product occurs firstly on two product sides and then on other two product sides opposed therewith.
47. Process according to Claim 37, characterised in that it further comprises the step of pressing said product to keep said product still during its packaging with said film (14).

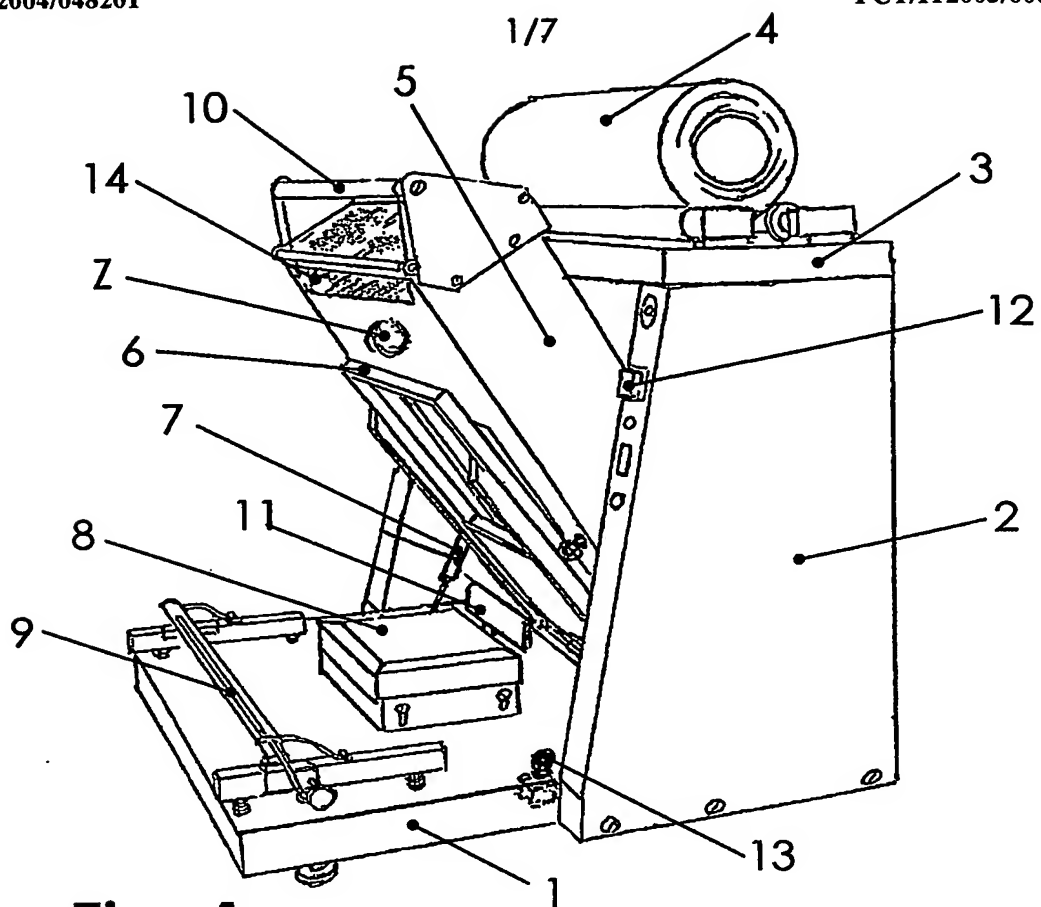


Fig. 1

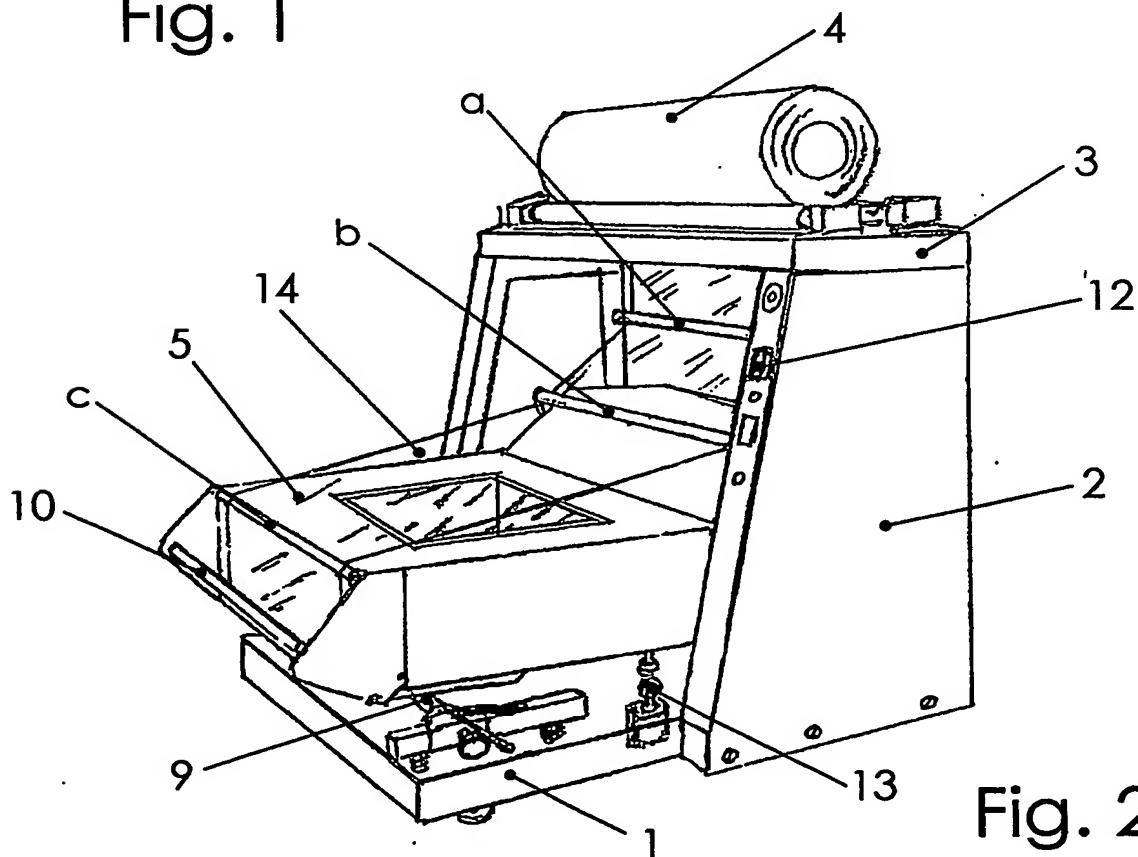
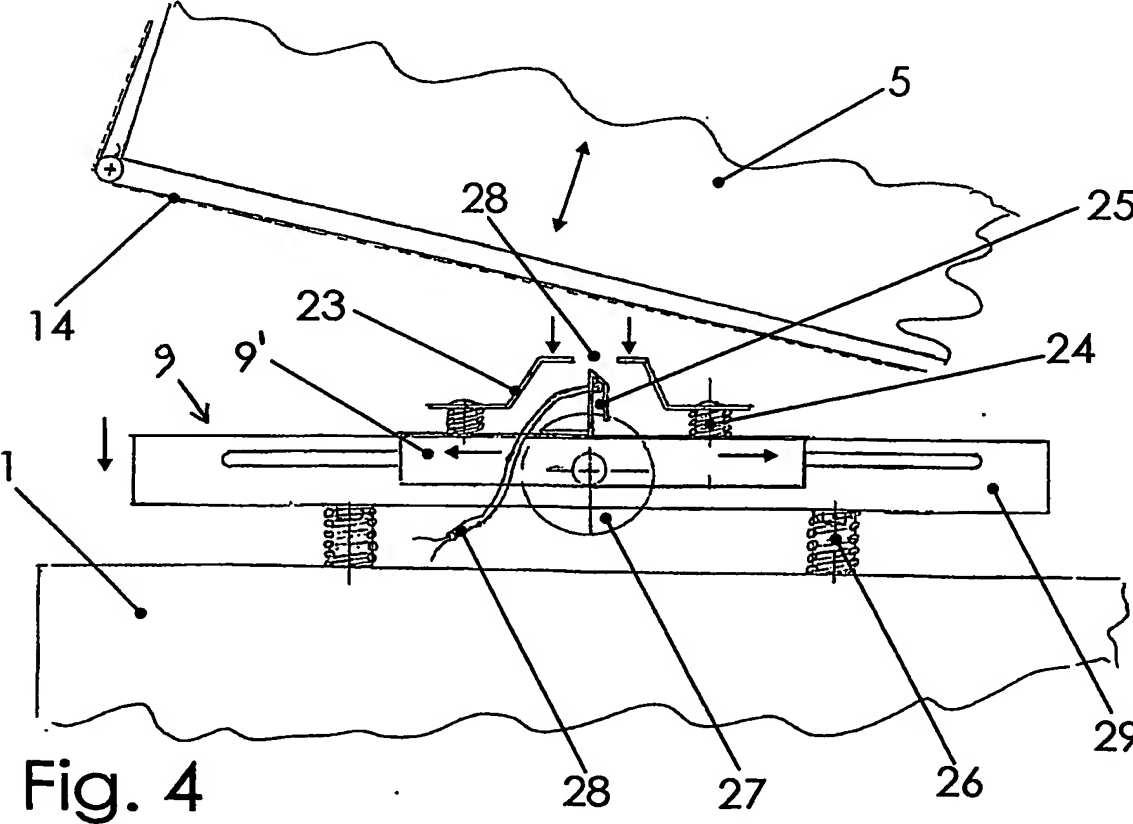
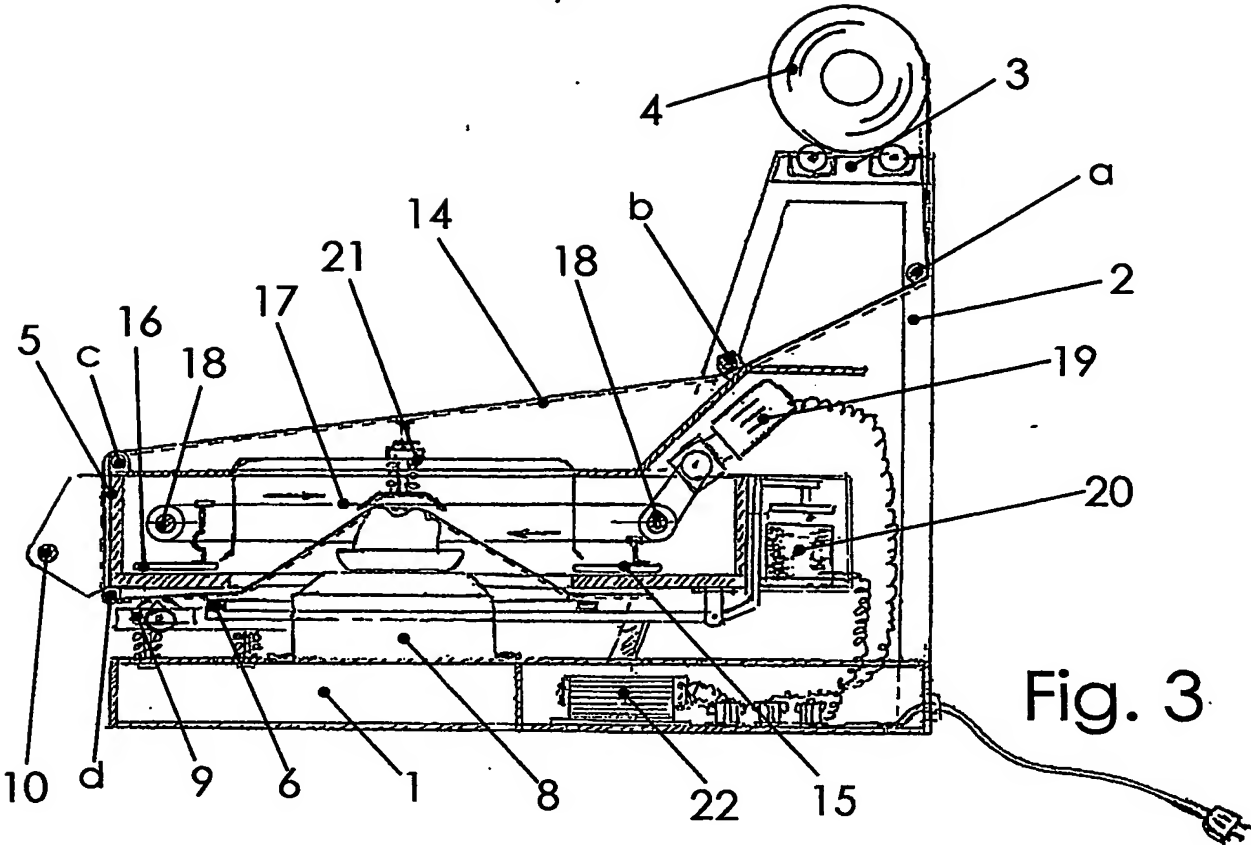


Fig. 2



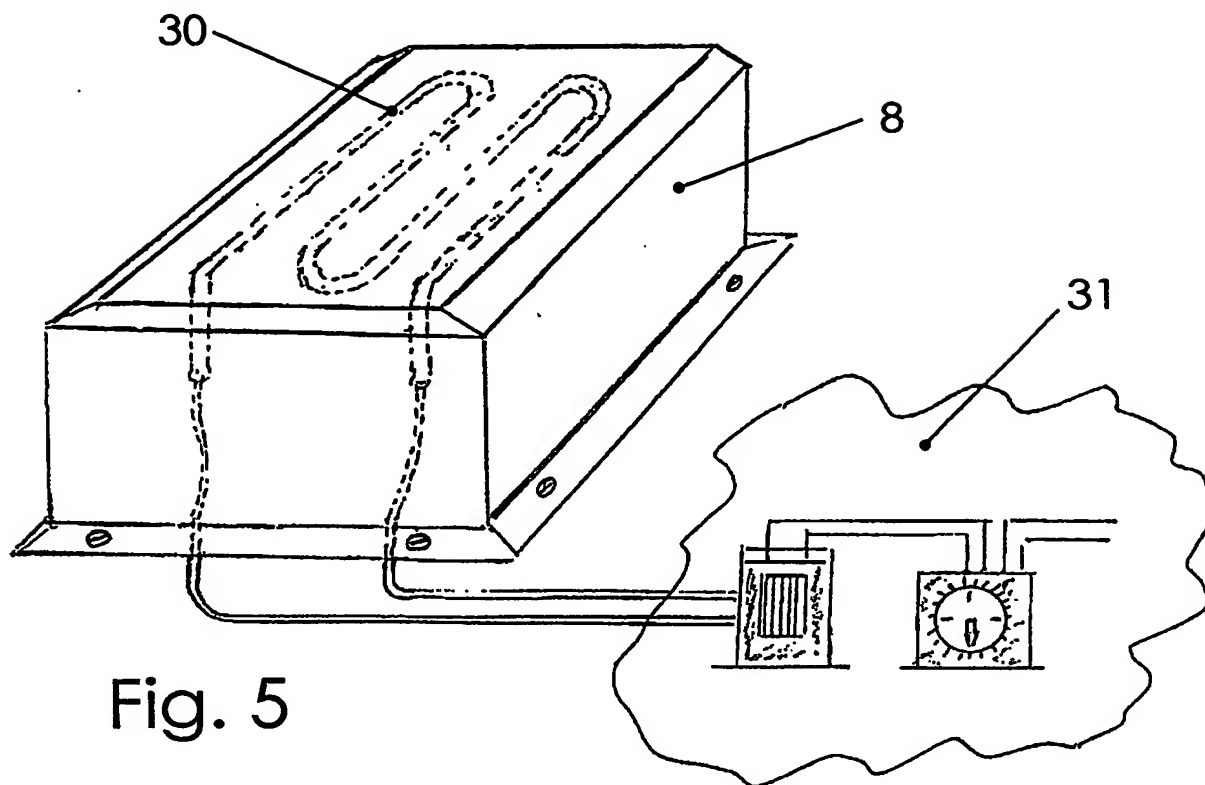


Fig. 5

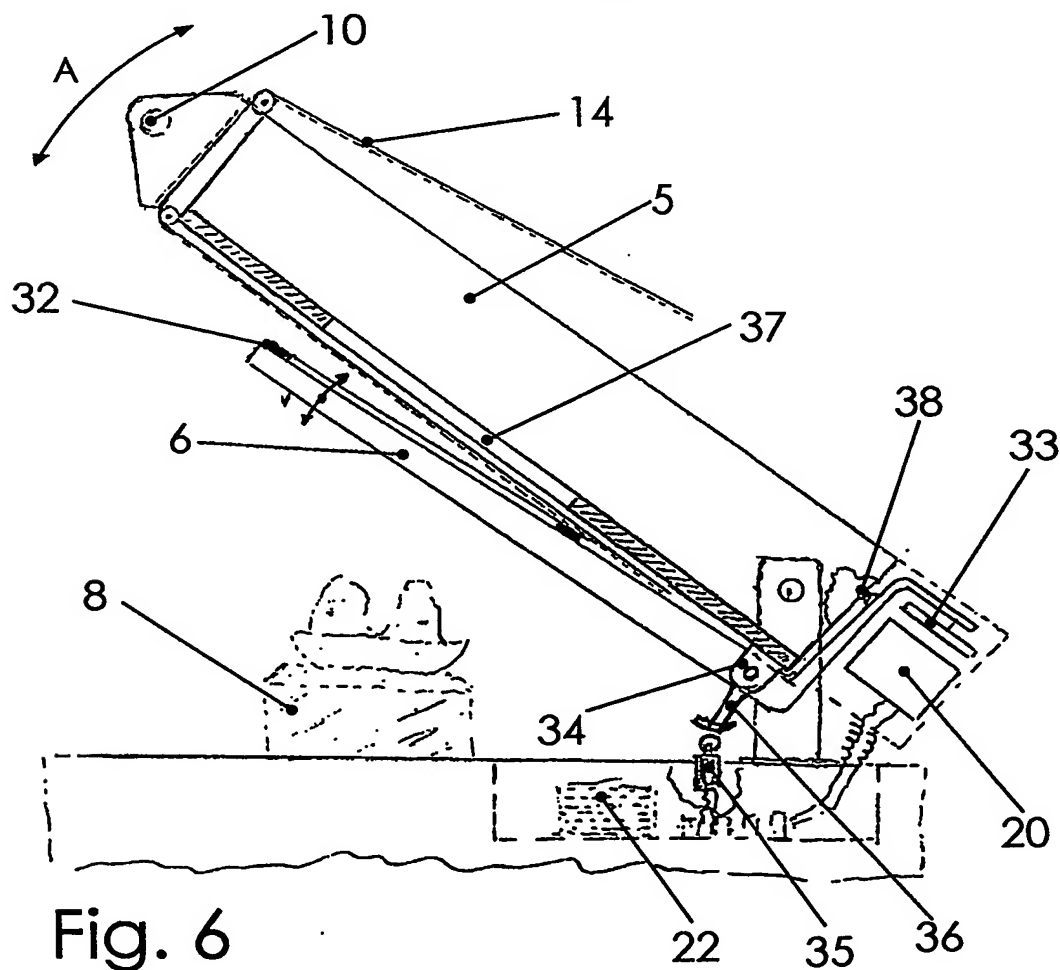


Fig. 6

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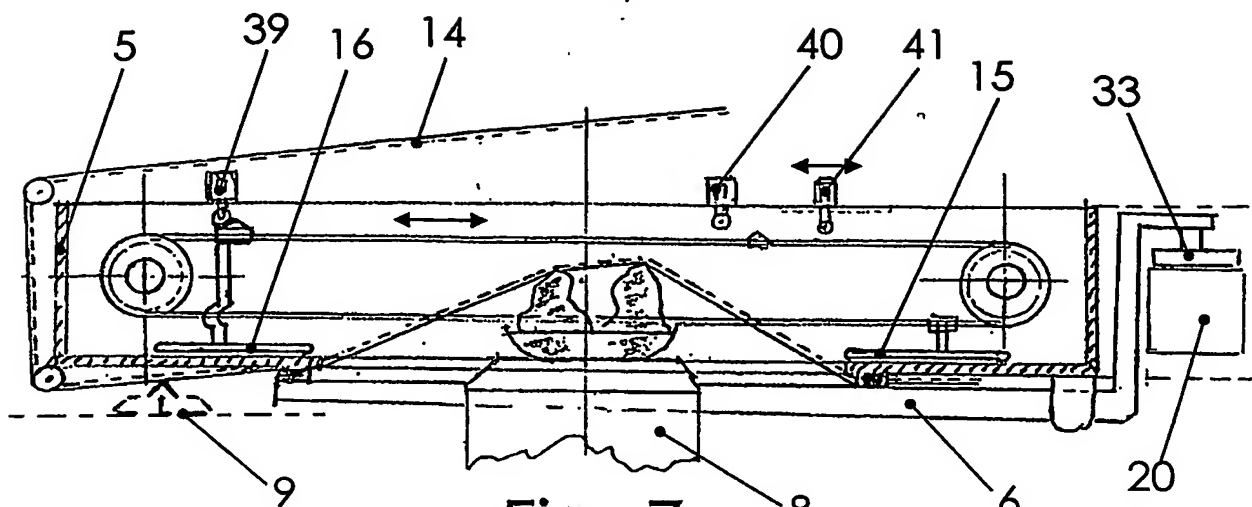


Fig. 7

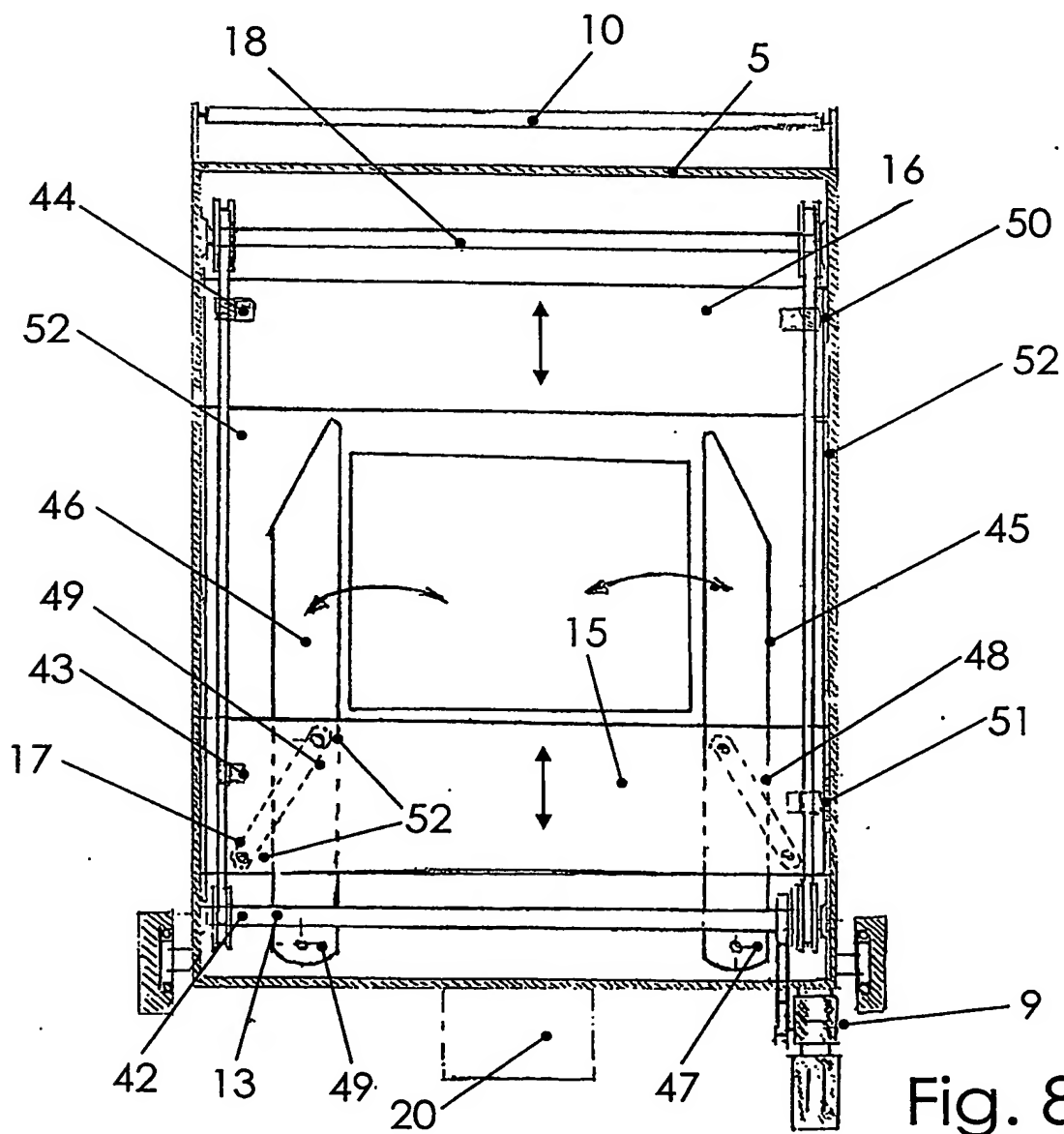
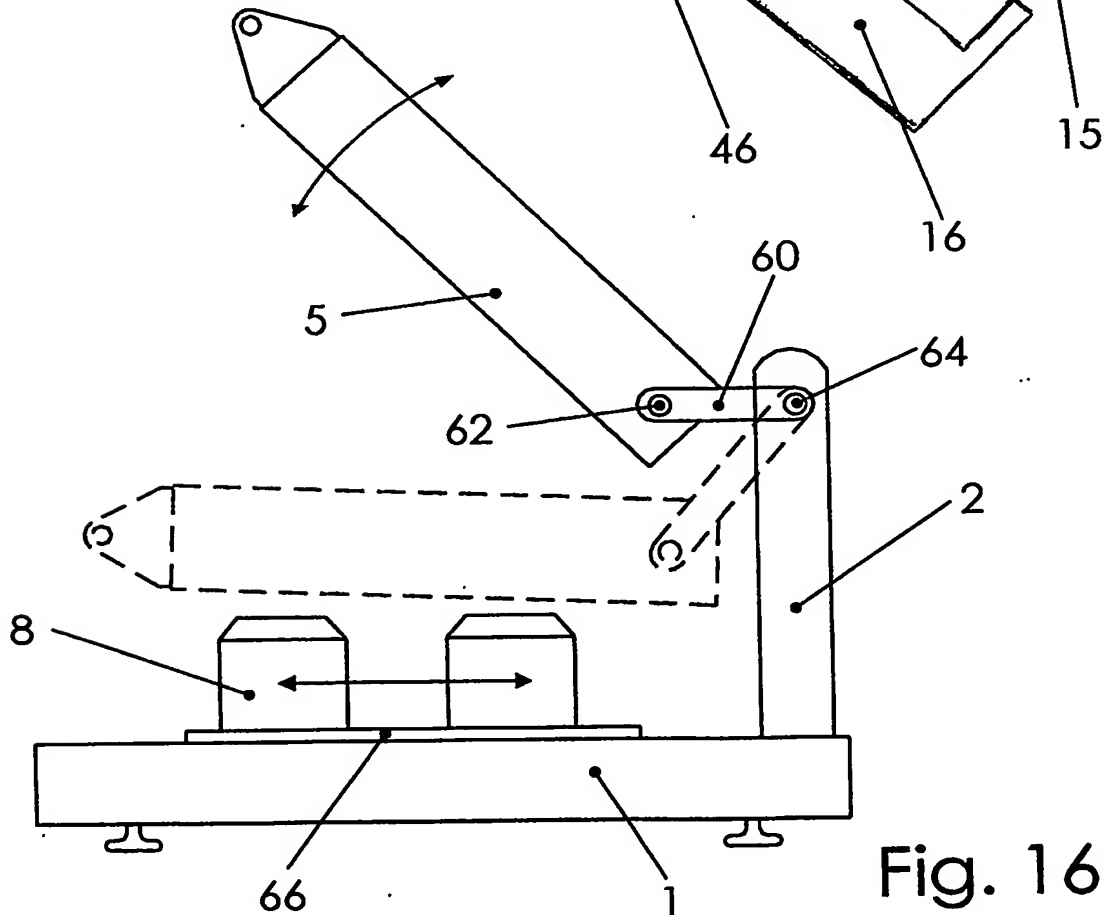
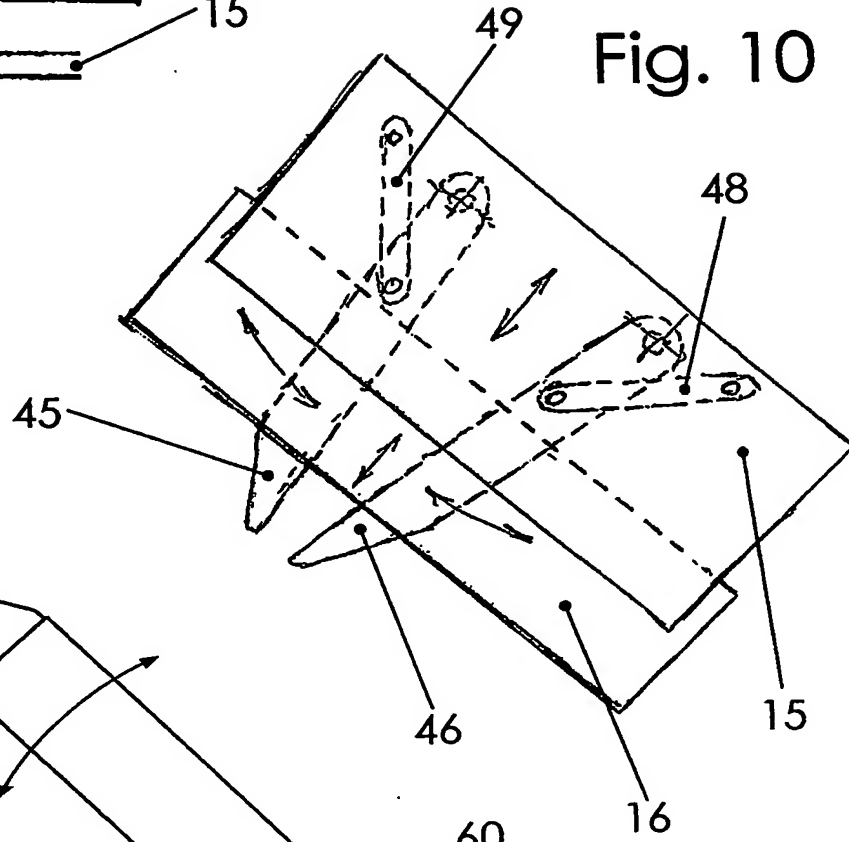
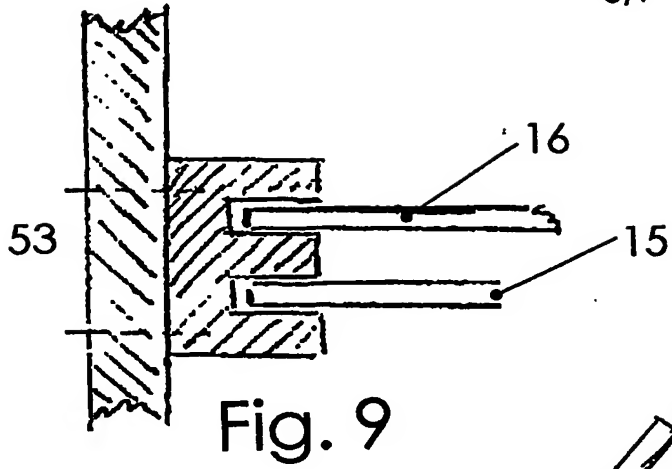


Fig. 8



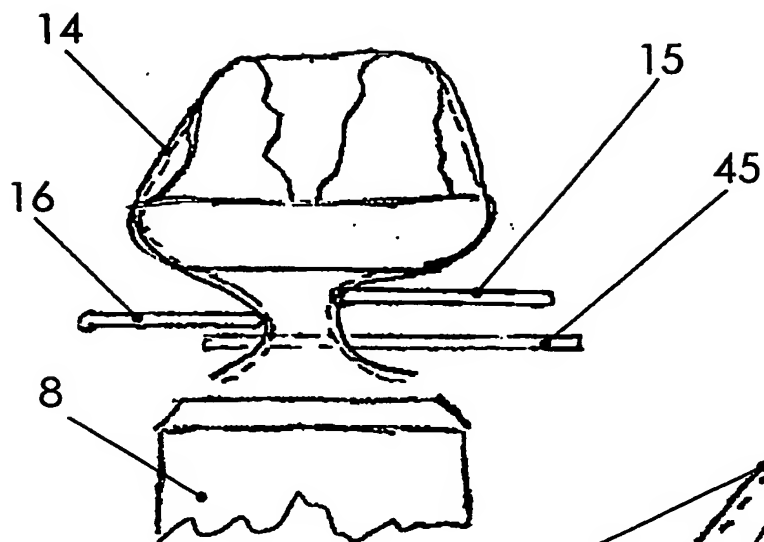


Fig. 11

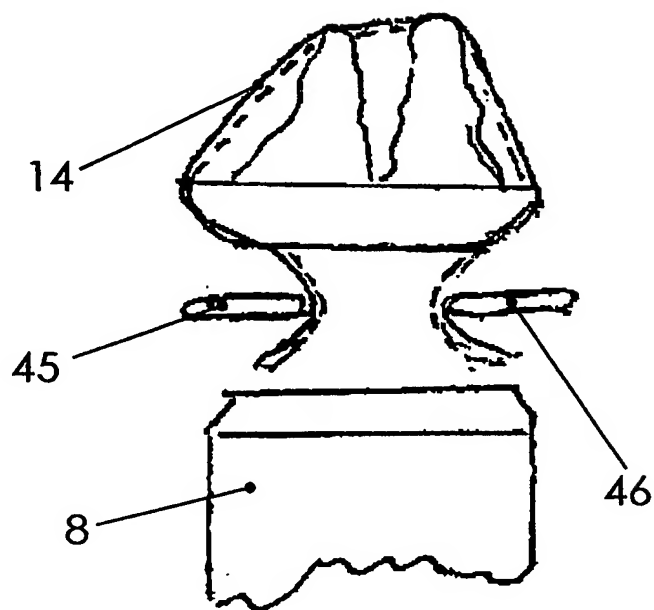


Fig. 12

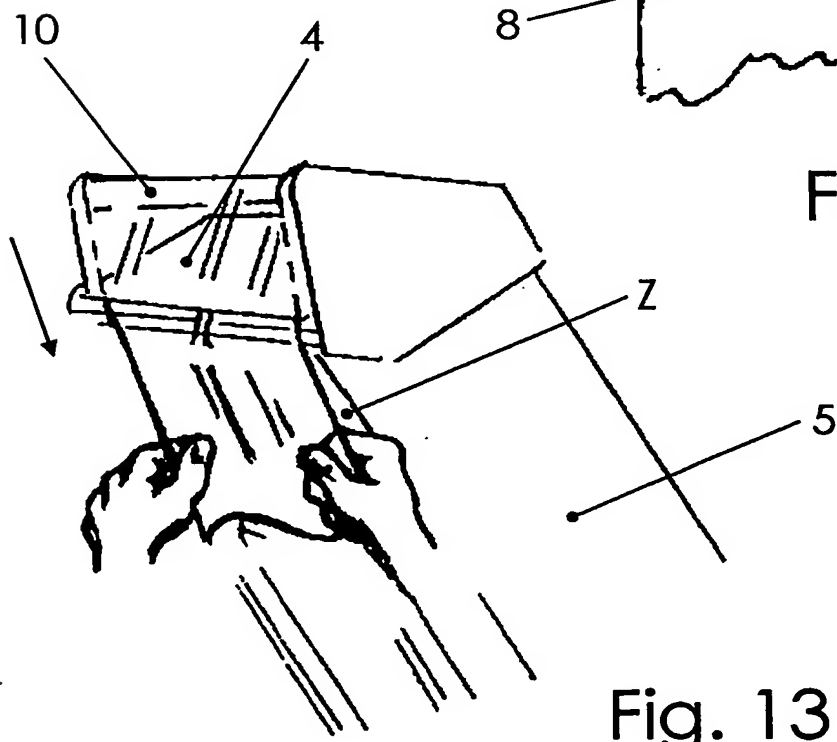


Fig. 13

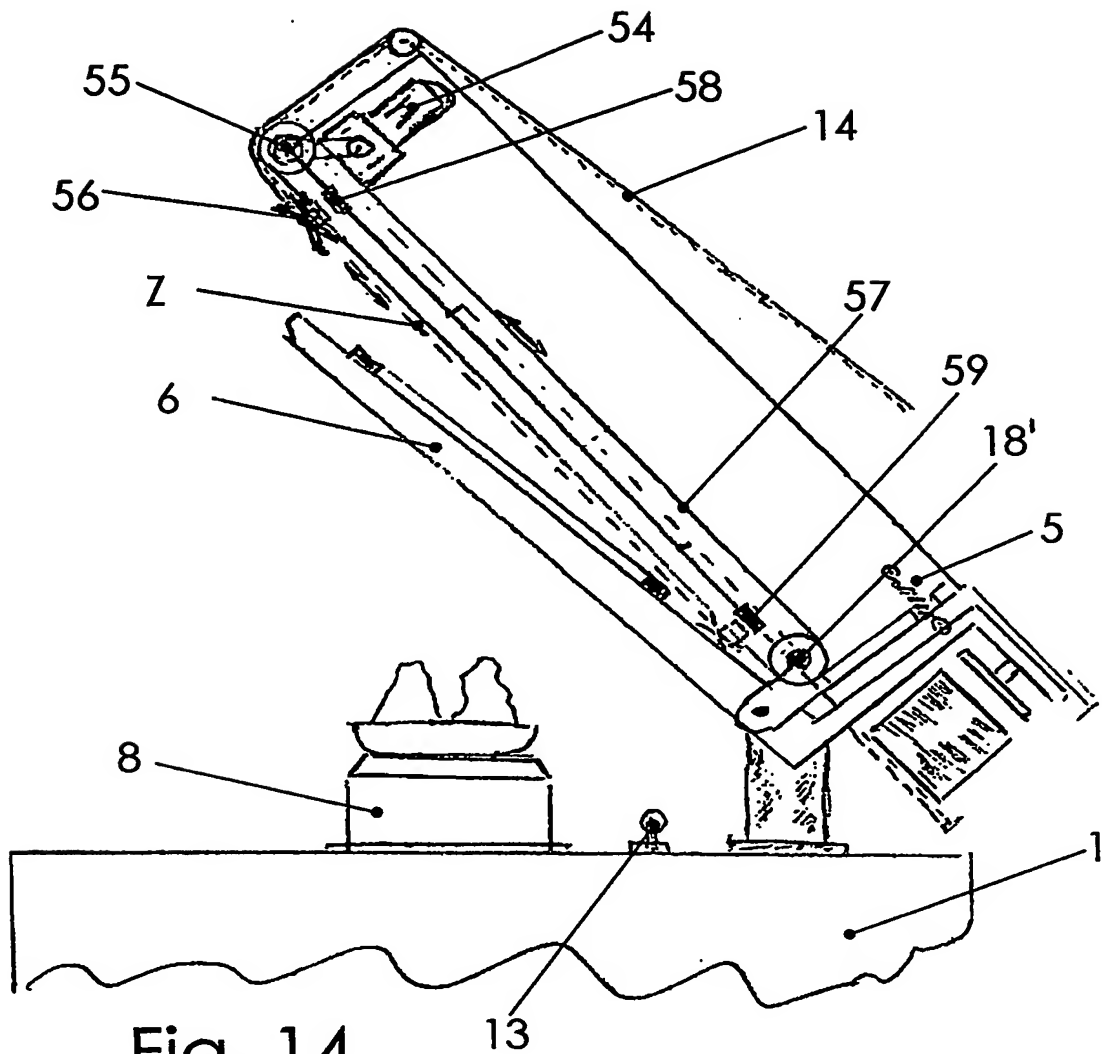


Fig. 14

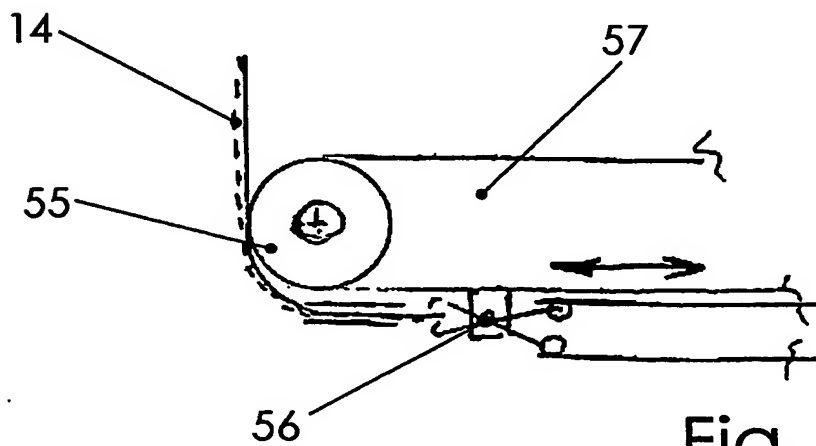


Fig. 15

INTERNATIONAL SEARCH REPORT

International / Patent No.

PCT/IT 03/00256

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B65B11/54 B65B51/14

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B65B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3 967 433 A (BONFIGLIOLI SERGIO) 6 July 1976 (1976-07-06)	1, 20, 25, 37-40
Y	column 3, line 35 -column 5, line 68; figures	44, 47
Y	US 6 185 913 B1 (CAPPI ANGELO ET AL) 13 February 2001 (2001-02-13) column 7, line 29 -column 10, line 53; figures	44, 47
A	EP 0 890 508 A (TOKYO ELECTRIC CO LTD) 13 January 1999 (1999-01-13) column 20, line 16 -column 23, line 48; figures	1, 37
A	US 4 650 535 A (BENNETT CHARLES J ET AL) 17 March 1987 (1987-03-17)	
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Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

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Date of the actual completion of the international search

2 September 2003

Date of mailing of the international search report

09/09/2003

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INTERNATIONAL SEARCH REPORT

International Patent No.
PCT/IT 03/00256

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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International Publication No

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